

Ames Education & Public Outreach 2011

Presentation for NASA Advisory
Council (NAC),
Education & Public Outreach
Committee

August 2, 2011





Welcome



Mr. Gary Martin
Director, New Ventures and Communications
gmartin@nasa.gov
650.604.2400



Agenda (8:30-11:00 am)

- 8:35 Welcome & Introduction – Mr. Gary Martin
- 8:40 Overview of Ames Education & Public Outreach
– Mr. Donald James
- 8:50 Higher Education – Ms. Brenda Collins
- 9:20 Elementary & Secondary Education – Mr. Tom Clausen
– Smart Skies™ – Mr. Greg Condon
- 9:50 Informal Education & Outreach – Ms. Laura Lewis
- 10:05 Social Media & NASA Apps – Mr. John Yembrick & Mr.
Jerry Colen
- 10:20 Spaceward Bound & NASA Academy – Dr. Liza Coe
- 10:40 Robotics Academy & LMR – Mr. Mark Leon & Ms. Jenny
Yang

Agenda (1:30-2:45pm)

1:30 LADEE EPO – Mr. Brian Day

1:45 KEPLER EPO – Ms. Edna DeVore

2:00 SOFIA EPO – Dr. Dana Backman

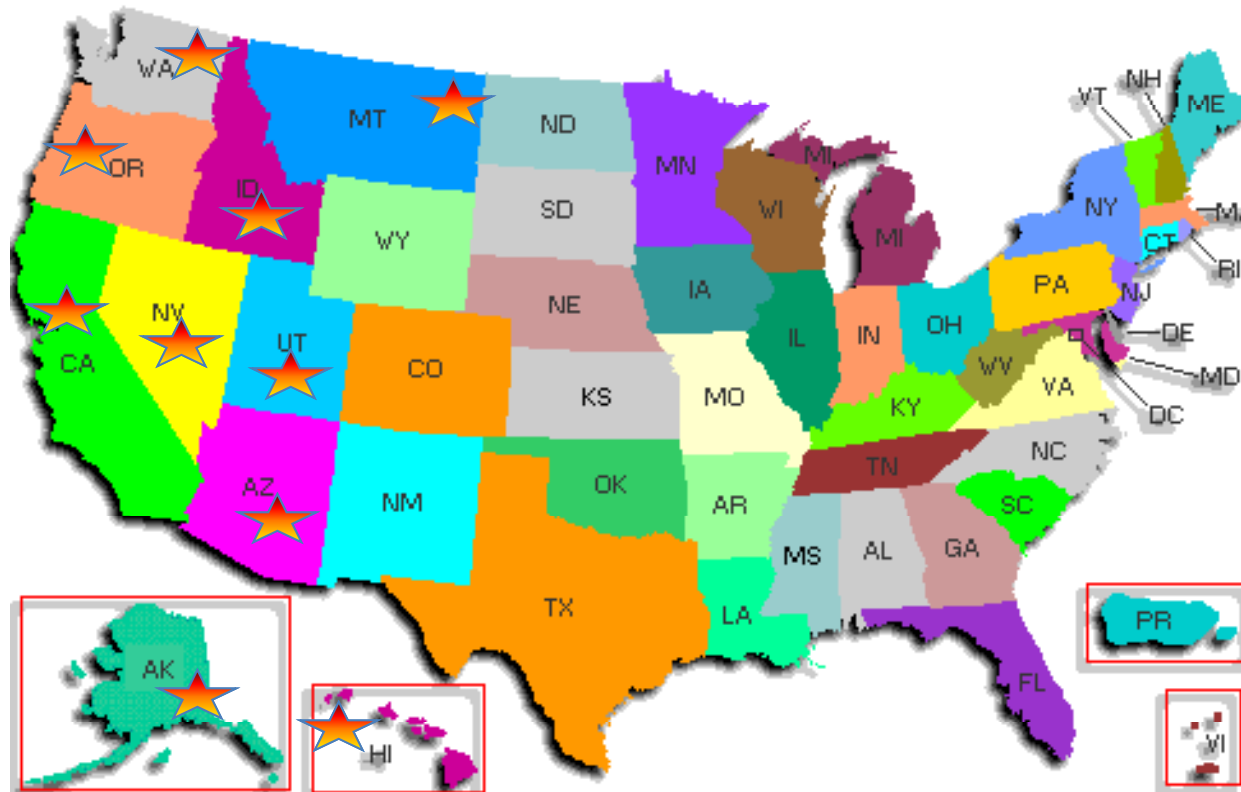
2:15 NASA Astrobiology Institute – Ms. Daniella Scalice

2:30 NASA Lunar Science Institute – Dr. Yvonne Pendleton



Overview

NASA Ames Education & Public Outreach



Education Director, Acting
Deputy Director, New Ventures and Communications

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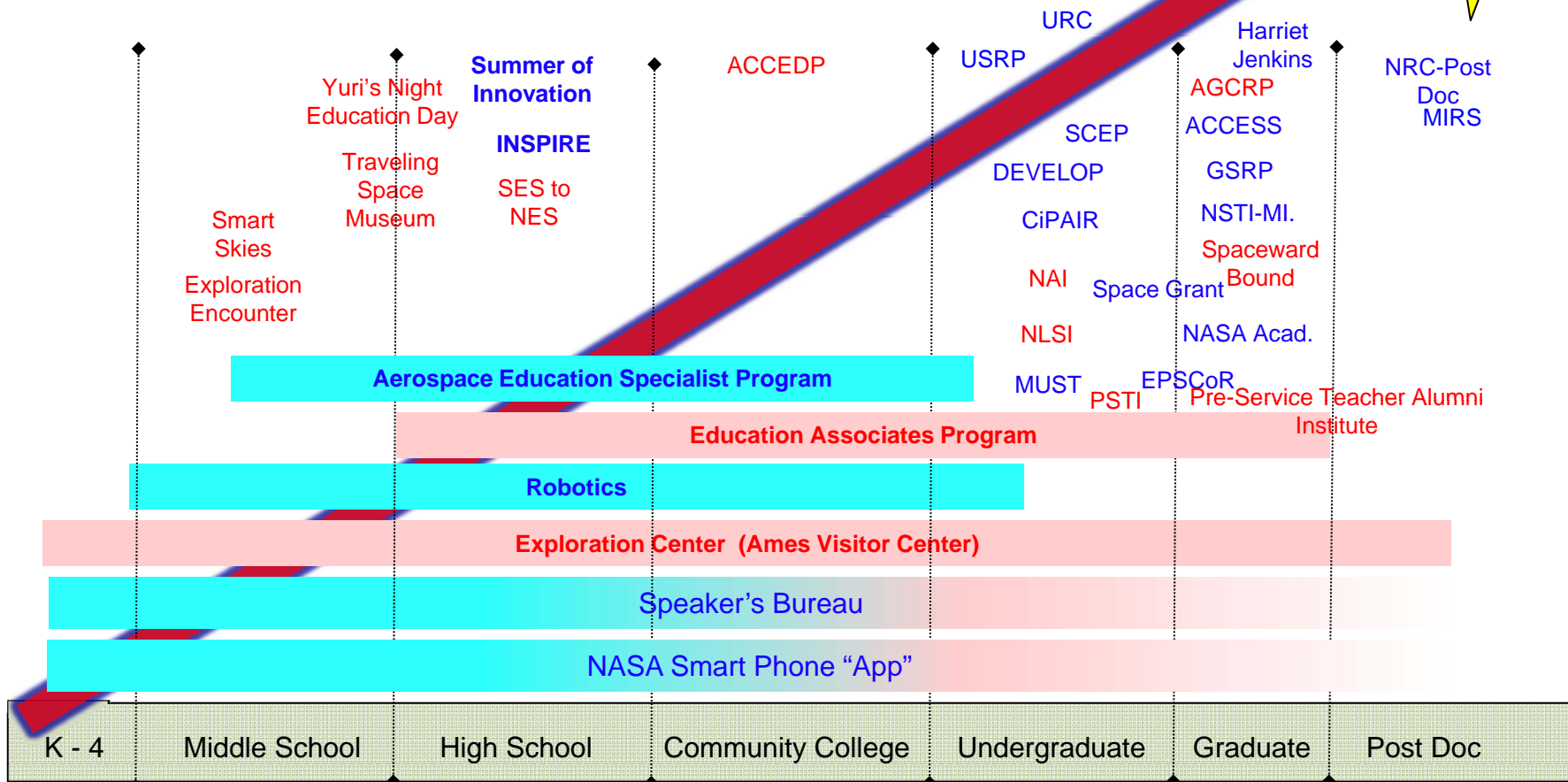
650.604.4967



Alignment with Education Design Team Top-level Recommendations (examples of how ARC aligns)

Focus the NASA Education Program on National need	Smart Skies, Robotics, Outreach to Middle Schools, Teachers, Underrepresented, Underserved, topic areas: Mathematics, Science, Technology, Engineering, Sustainability, Student programs
Identify & manage Strategic Partnerships	Smart Skies, Robotics, Spaceward Bound, Federal Aviation Administration, Environmental Protection Agency, Traveling Space Museum, Informal & Higher Education Partnerships
Participate in National & State STEM Education policy discussions	Involvement at symposiums, teacher conferences, Smart Skies, Spaceward Bound, Robotics
Establish a structure for strategically integrated portfolio	EPO Integration meetings, Education Associates Program
Enable deliberate program design & evaluation	Participate on ECC & CCC
Communicate to Inspire	Social Media, Tweet-ups, NASA Apps, Community events

1.5 Million + Impacted in 2010/11 alone!!



Ames Unique Programs
NASA Wide Programs



Ames Graduate Cooperative Research Education Program

An advanced, competitive, PhD-level intern and leadership program designed to develop and promote a cohort of graduates that are extraordinary in their scholarship and are prepared to assume leadership roles in fields of research and aerospace operations critical to NASA's missions. The students focus their PhD work on important NASA needs. Their thesis helps advance research and engineering unique to NASA missions.

Students are....

- ✧ Student Career Employment Program (SCEP) students (20/hrs week work at ARC)
- ✧ PhD Candidates – discipline aligned with ARC research/work
- ✧ Currently from Stanford & UC Santa Cruz; program open to other top universities
- ✧ Researching areas focused on NASA mission:
 - Decision & Risk Analysis
 - Small Spacecraft Dynamics/Controls
 - Directed Energy Rocket Propulsion
 - Astrobiology Instrument Design
 - Paleo-Mars Climate Modeling



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Higher Education

Student Demographics
International Programs
Research Clusters
Center Unique Programs
Collaboration

Ms. Brenda Collins
Higher Education National Programs Manager
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650.604.3540



Summer 2011 Participants: 826 (*indicates opportunities for educators)

Program	Number of Participants	Program (cont.)	Number of Participants
ACCESS	2	NASA Ames Robotics Academy	33
Aero Scholars	2	NASA Exploration Academy	14
Ames Community College Education & Development Program	30	National Space Biomedical Research Institute	3
CIPAIR	3	NSTI	3
Code A (unique programs)	1	NSTI Faculty	2
DEVELOP	18	PSTI*	20
Education Associates Program	205	PSTI+*	20
NASA/EPA Internship Collaboration	11	Singularity University	80
EPSCoR	3	Space Grant	19
Greene Scholars	29	Science Teacher And Researcher	12
GSRP	13	SCEP/STEP	27
iGEM	19	Ames STEM Symposium	170
INSPIRE	20	TCUP	4
International Space University	6	System Teaching Institute (UARC)	7
JPPF	7	URC	7
Mission Critical Technology Internship	2	USRP	21
MUST	13		



Higher Education Program Participants by State

PSTI Plus – 18

ACCESS – 2

EPSCOR – 3

NSTI – 5

CIPAIR– 4

Space Grant – 19

RAP – 16

GSRP – 11

STAR – 12

MUST – 16

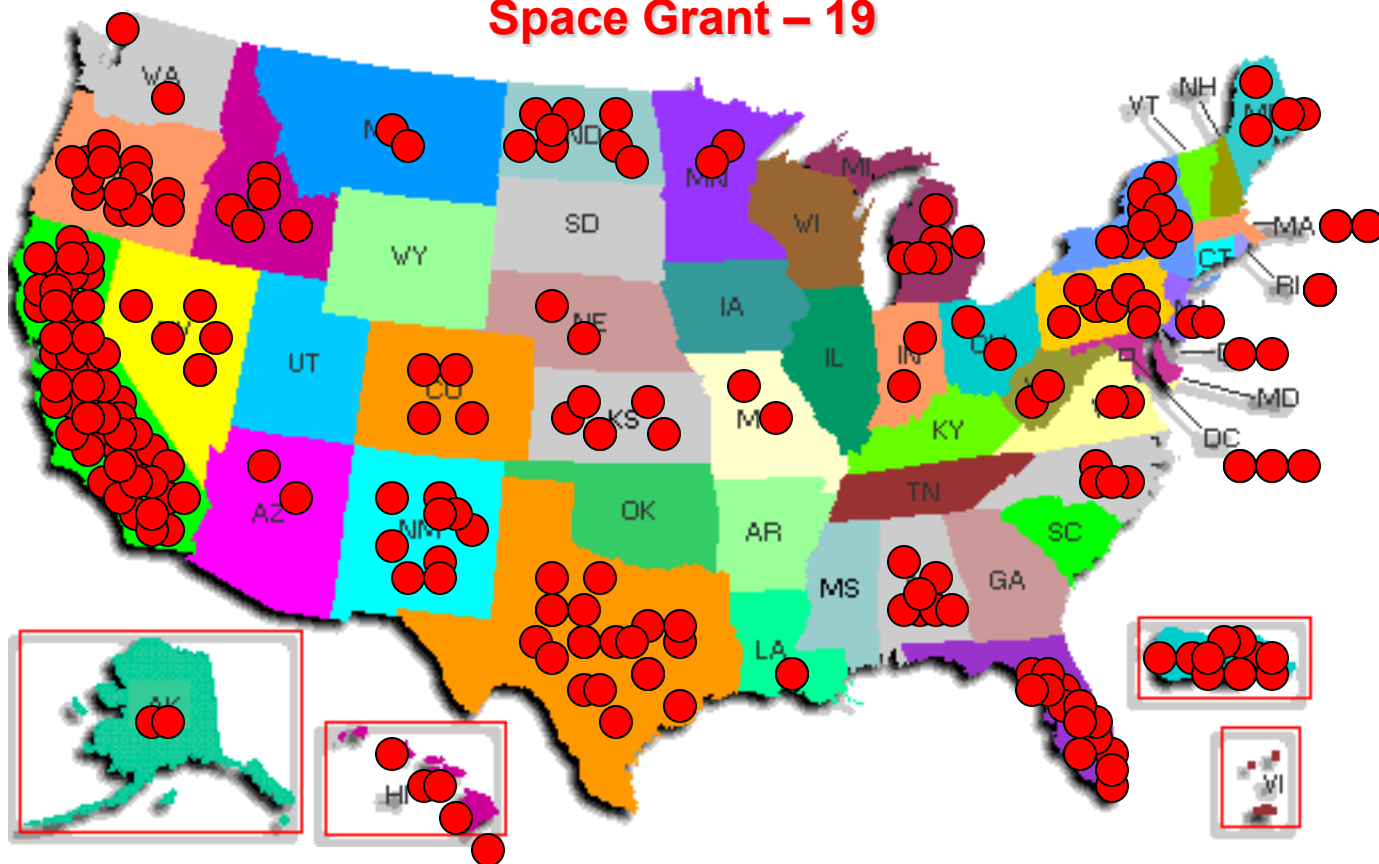
URC – 7

TCUP – 4

AERO – 2

USRP – 21

JPFP – 7



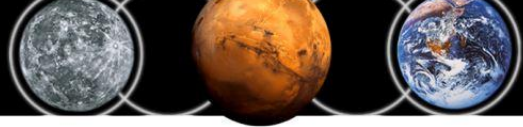
TOTAL – 146



Demographic Comparison

	Civil Servants (FY'09) %	Higher Education Program (Summer 2011) %
Multi-racial	.47	0
American Indian or Alaska Native	1.05	6.0
Native Hawaiian	0	1.0
Asian	19.96*	9.0
Black or African American	5.19	10.0
Hispanic or Latino	7.54	17.0
White	65.76	42.0
Undisclosed	0	15.0
Male	69	54.0
Female	31	46.0

* Includes Pacific Islander



Ames has a vibrant international student community



Total International Interns: 58

Country		Fall 2010 to Current
Australia		4
Algeria		1
Belgium		5
Canada		2
China		1
France		7
Germany		2
India		2
Italy		2
Japan		1
Netherlands		8
Saudi Arabia		5
South Africa		2
South Korea		3
Spain		2
UAE		8*
United Kingdom		3

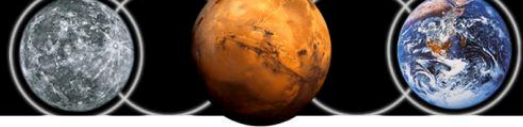
* ARC Reimbursable



National Project Management Harriett G. Jenkins Pre-Doctoral Fellowship Project

The JPFP provides competitive fellowships designed to successfully navigate students who are underrepresented in STEM disciplines through the graduate degree pipeline to enable their successful entry into the STEM workforce. 20 fellowships awarded annually that provide support for a period up to 3 years.

- ❑ 13 NASA Ambassadors selected since 2008
- ❑ Students recognized both nationally and internationally for their NASA related research
- ❑ 87 Ph.D. graduates and 68 Master's graduates since 2001 (surpassing the initial goal of producing 100 STEM graduates by 2010)



National Project Management

NASA Science and Technology Institute for Minority Institutions

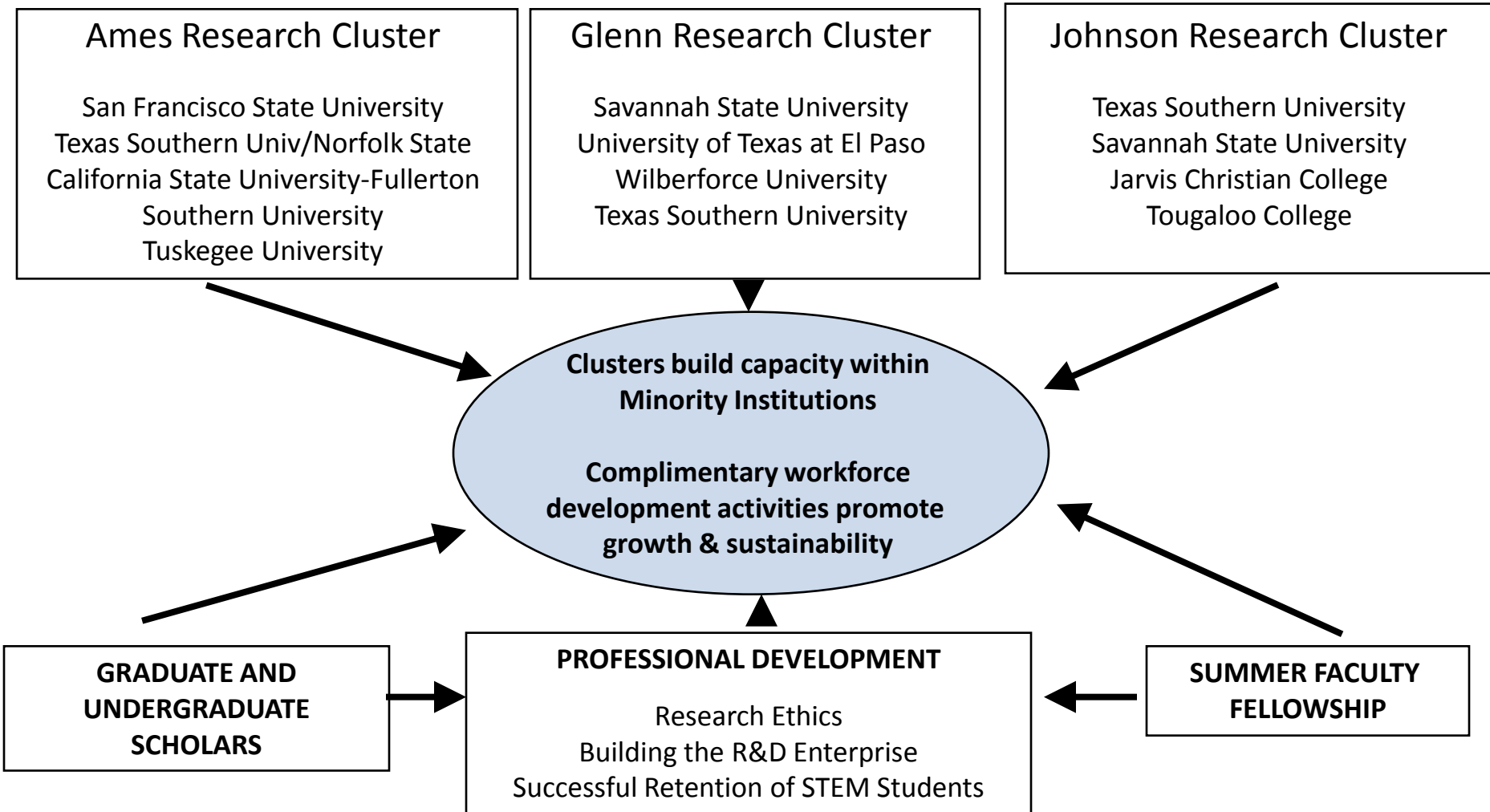
The NSTI provides an opportunity for MI scientists and researchers, including faculty, post-docs and students, to form multi-institutional teams that engage in collaborative research with NASA, other government agencies, industry partners, majority institutions and other minority institutions.

The resulting new research capacity will enable MIs to increase R&D efforts, garner additional funding, and use the research to augment courses in the STEM disciplines





NASA Science & Technology Institute (NSTI)





NSTI Research Cluster Accomplishments

- ❑ More than 25 undergraduate students, 10 graduate students, and three postdoctoral fellows, are currently involved in conducting NSTI Cluster related research projects throughout the academic year.
- ❑ Two institutions created/modified STEM curricula based on knowledge gained through cluster participation.
- ❑ 13 cluster-related research articles have been published in peer reviewed and non-peer reviewed journals.
- ❑ 14 publications are in development, including one book chapter.
- ❑ Faculty participants and post-doctoral fellows consistently serve as mentors and advisors for undergraduate participants.



NSTI Summer Scholars

Summer Scholars participate at a host NASA NSTI Cluster Center for 10 weeks and work on NSTI Cluster-related research projects with NASA Scientist

- ☐ Over 75 participating undergraduate and graduate students since inception in 2006.
- ☐ Scholars represent more than 25 minority serving institutions, including tribal colleges and universities.
- ☐ 70% of undergraduate scholars continue on to pursue graduate studies in STEM
- ☐ 15% of Scholars have pipelined into other NASA education programs



2011 UNCFSP/NASA Ames STEM Symposium

Renewing the Spirit of Innovation and Discovery

200 researchers, faculty members, and students attended the symposium to receive professional development training, present innovative research projects, and network with other project participants.

☐ July 25-28, 2011 in San Jose

Highlights include:

☐ An Achievement Ceremony

☐ Ames Mentor Recognition

☐ Day at Ames on July 27, 2011

☐ Innovative Research Presentations





Pre-Service Teacher Institute

20 Pre-Service Teacher Institute (PSTI) participants and 20 PSTI Alumni successfully completed the program on June 24th.

- ❑ 100 middle school students attending CSU Fresno's After School University Program participated in the lesson plan demonstration

128 pre-service teachers completed Ames' program

- ❑ 47 have completed their teaching credential
- ❑ 49 are currently teaching





Student Teacher and Researcher Program (STAR)



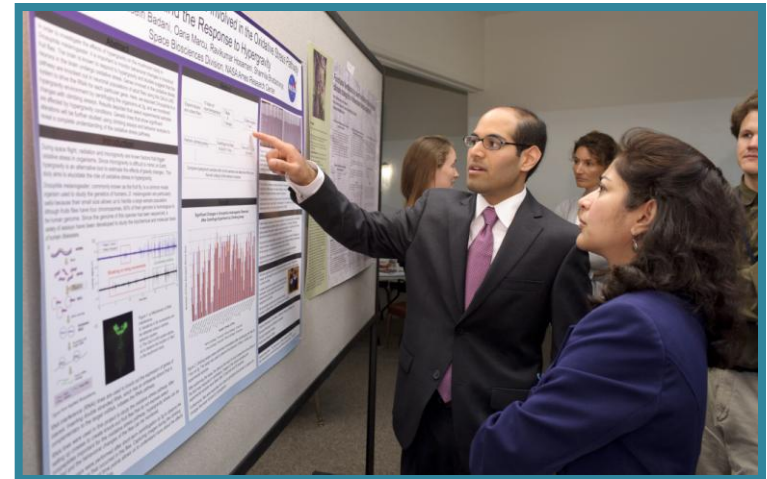
- ✓ **The STAR Program** places prospective and early career teachers with strong academic backgrounds in science, math, and engineering internships at NASA Centers and National Laboratories.
 - ❑ A key feature of STAR are weekly science education workshops and seminars led by master teachers and university faculty.
 - ❑ The STAR program model successfully integrates intensive research experiences with a teacher education program to create teachers who see themselves as both teachers and researchers.
- ✓ **Ames is hosting 12 STAR students.** The program is funded by Cal Poly's Center for Excellence in Science and Mathematics Education (CESAME).
- ✓ **Since 2008**, 42 pre-service and early career teacher have conducted internships at Ames.
 - ❑ 84 – 89% currently report they are following a teaching career path.



Education Associates Program (EAP)

- ✓ The NASA EAP is a unique workforce development program that provides hands-on experience for participants in the areas of science, technology, engineering and math (STEM) and other academic disciplines.
- ✓ Flexible Associateships in duration and academic level to meet the array of NASA research and management needs.
- ✓ Contributes to the STEM workforce through Education and Employment.

- ❑ First program year: 1996
- ❑ Number of years: 15
- ❑ Average annual participants: 138
- ❑ Total participants through end of 2011 (anticipated): 2,070
- ❑ Participants in 2011 (anticipated): 290
- ❑ Participants entering STEM fields upon completion (average): 93%
- ❑ Participants hired by NASA or NASA contractors upon completion (average): 12%



Website: <http://eap.usra.edu> utilizes on-line application, project submission, and communication tools.



Ames Community College Education and Development Program (ACCEDP) (Formerly FHDA Internship Program)

- ✓ ACCEDP endeavors to build and maintain partnerships with all Bay Area Community Colleges, creating opportunities for a more diverse pool of community college-level students.
- ✓ 1 or 2 year internships with specific educational and/or project-based goals.
- ✓ Contributes to the STEM and mission support workforce.

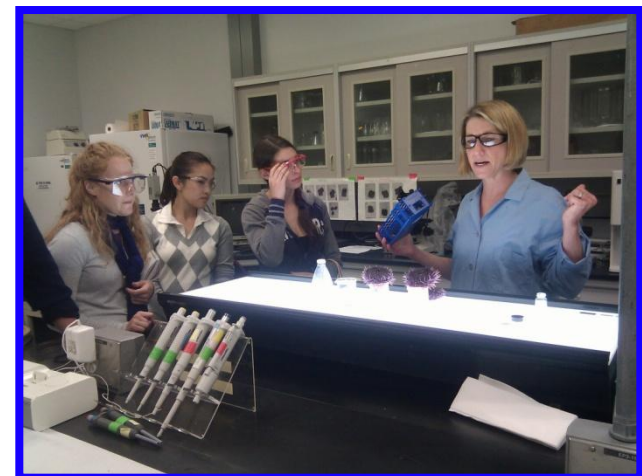
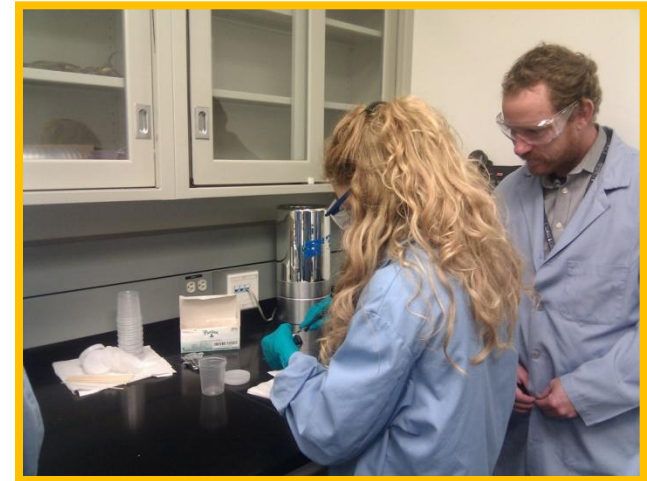
- ❑ First program year: 1993
- ❑ Total Participants (since 2003): 1,220
- ❑ Participants in 2011 (anticipated): 60
- ❑ Goal number of Bay Area community colleges participating in program: 15
- ❑ Participants entering STEM workforce after program completion: 30% - 40%
- ❑ Participants hired by NASA or NASA contractors after program completion: 15%





EPA-NASA Joint Collaboration

- ✓ This is the first collaboration between the EPA and NASA consisting of 11 EPA interns and 13 NASA interns.
- ✓ MOU signed on July 19, 2011 at the EPA region 9 headquarters in San Francisco
- ✓ The interns will focus on crafting the program to create mutually beneficial outcomes for both organizations and have selected the following joint projects:
 - ☐ Greening emergency response operations through improved technology
 - ☐ Using fuel cells instead of diesel generators for backup power, and
 - ☐ Reducing packaging weight to reduce transportation emissions.





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Elementary and Secondary Education

Summer of Innovation
Ames Exploration Encounter
Smart Skies

Mr. Tom Clausen
Lead, Elementary and Secondary Education
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650.604.5544



Summer of Innovation



Supports the Nation's Educate to Innovate Campaign



GSP wants to make this an annual event

- **Greene Scholars Program (GSP) Summer Science Institute**
 - Week-long program; activities to develop skills in STEM, problem solving & entrepreneurial/leadership
 - Curriculum was collaborative GSP/ARC effort
 - 30 underprivileged students and 10 facilitators
 - Closing ceremonies attended by 25 parents

Ames Exploration Encounter (AEE)

- Free field trip experience for 4th-6th grades
- 8500 students and 1767 adults and special guests (FY'11)
- 6750 students from 54 schools
- 29 cities in our region represented (including Reno, NV))
- Provided customized experiences for visits from Pacific Autism Center for Education (PACE) and California School for the Blind





SMART SKIES™

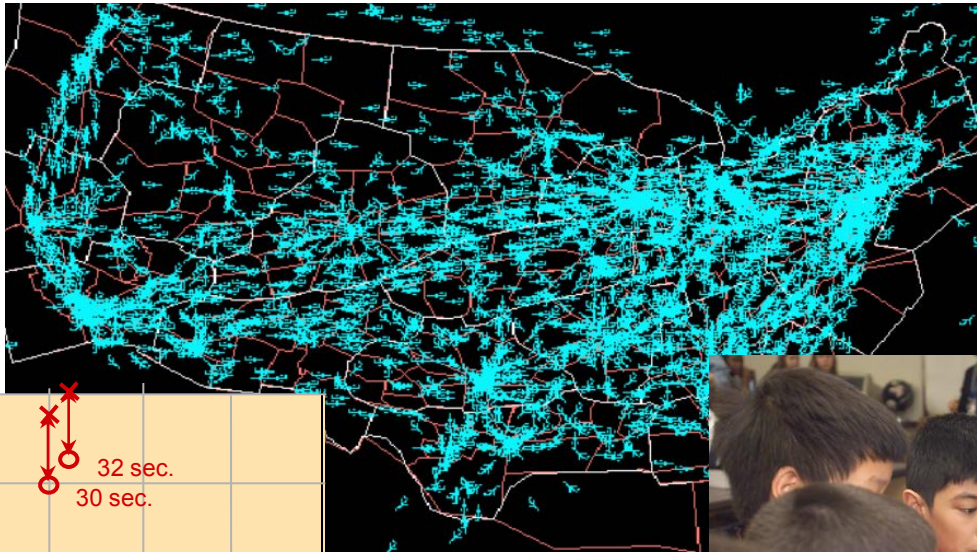
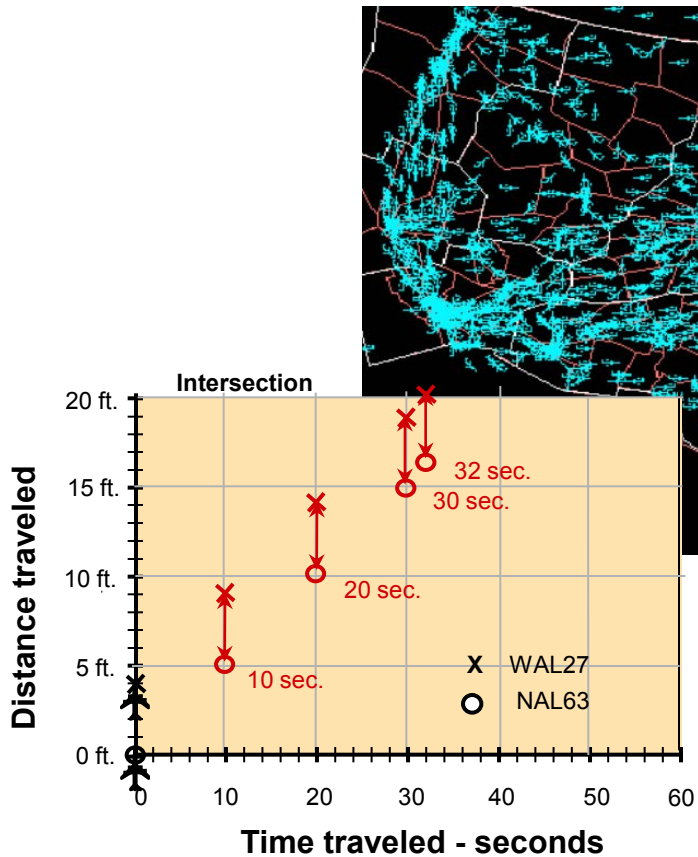


Mr. Greg Condon
Smart Skies Project Manager
Gregory.Condon@nasa.gov



Smart Skies™

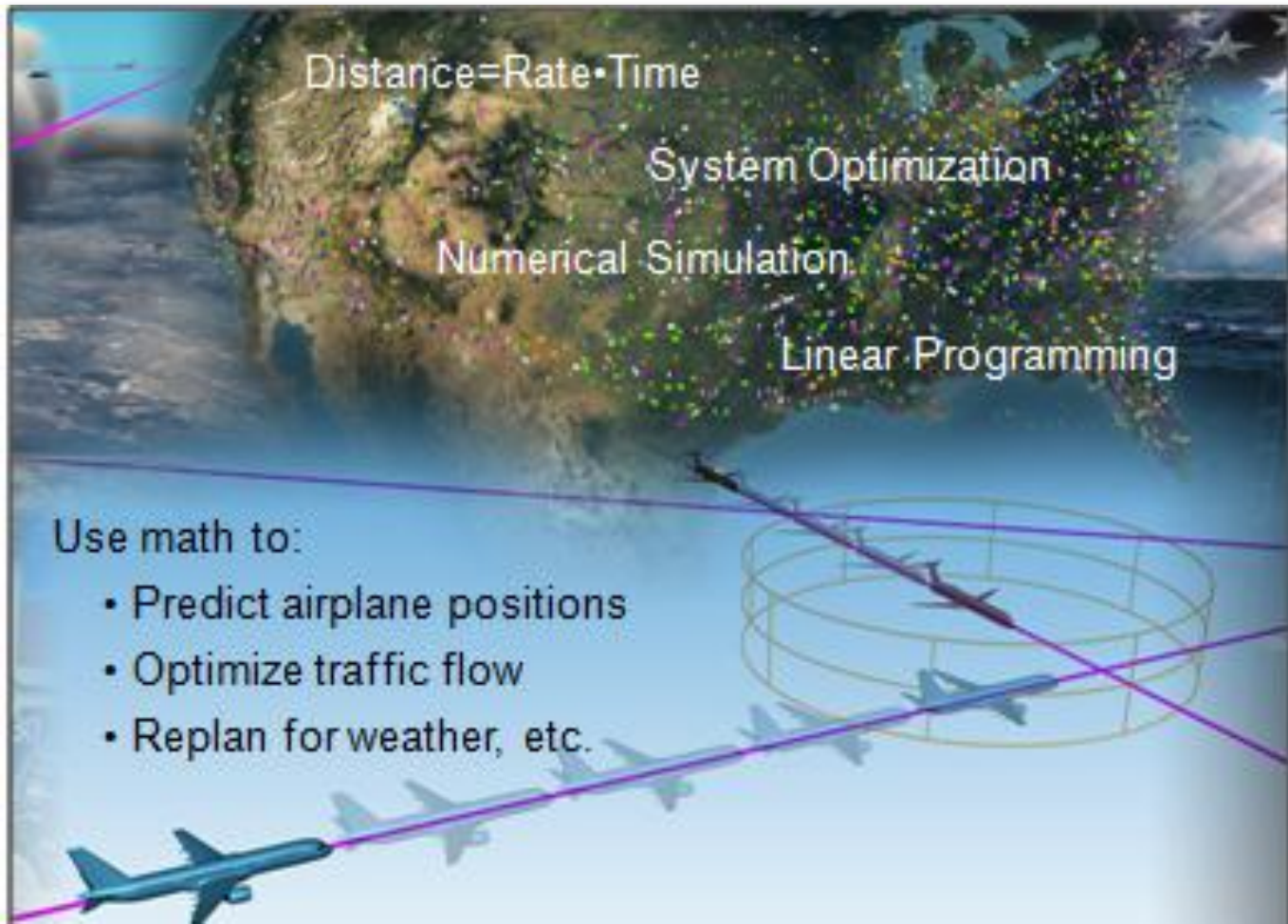
Education for the NextGen Airspace System





Next Generation Air Traffic System

NASA ARMD leads the research & technology.





Smart Skies™



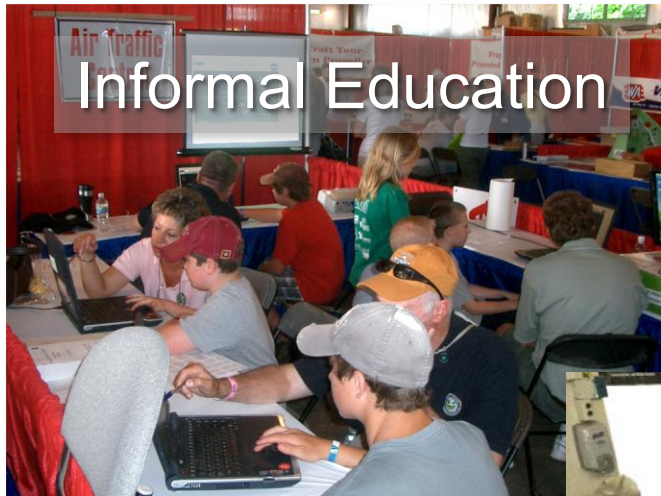
24 Hours Of Flight

A 60-Second Animation



Our Education Challenge

Inspire and help prepare students to meet the STEM challenges of the 21st-century NextGen.



Grades 5-9

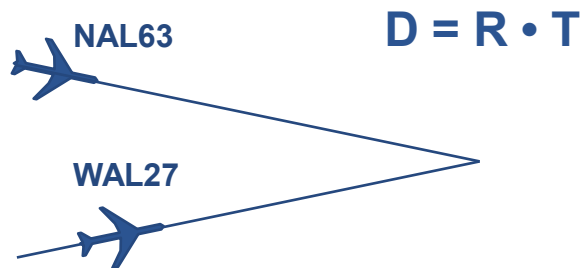




Formal Classroom Education

Two *standards-based* activity sets – grades 5-9

FlyBy Math



Pre-algebra or Algebra

- Tested in classrooms nationwide with over 6,000 students – received “A” rating.
- Cover article: NCTM Journal of Mathematics Teaching in the Middle School, Aug 2006

LineUp With Math



Pre-algebra





Line Up with Math video



Teacher Professional Development

Smart Skies education team conducted 110 professional development workshops for grades 5-9 teachers:

National, Regional, State: NCTM, NSTA, CMC, AMTNYS...



Additional workshops conducted by:

- Aerospace Education Specialist Program
- Explorer Schools Program
- Digital Learning Network
- Pre-Service Teacher Institute
- Materials for trainers



- Received “outstanding” rating by 91% of teachers; California Math Council-S annual conference, 2007-2010.



Partnerships and Informal Education

We train partnership staff to conduct informal education activities on Smart Skies

- NASA/FAA MOU in Education – Smart Skies
 - Trained Associate & Regional Administrators
 - Trained all 3,000 ATC Supervisors.
 - Centerpiece of education outreach – summer camps, fly-ins, career days, etc.
- Aviation orgs: NCASE, AIAA, WIA, EAA, NATCA, ...
- Museums: Smithsonian Udvar-Hazy Center, Hiller, Boston MOS, ...
- Training/event materials for docents, etc.



MOU Signing Ceremony





Full Suite of Materials Online

- Videos
- ATC simulator (java applet)
- Linked visualization tool (java applet)
- Student workbooks
- Teacher guides with answers and solutions
- Alignments to state math standards, grades 5-9
- Web pages for teachers, students, trainers, and outreach providers

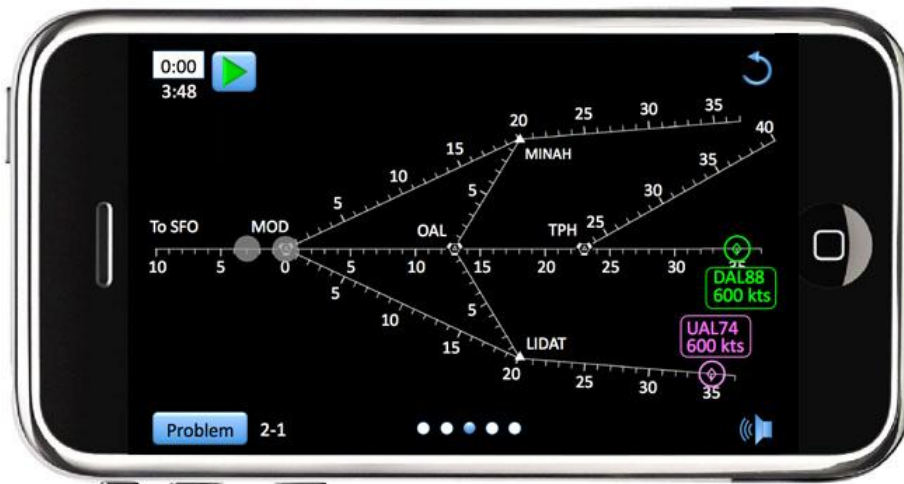


Development of Mobile App ATC Simulator

Objectives:

- To inspire student interest in careers in NASA and in air traffic control by engaging them in a challenging educational game.
- To improve student problem solving and proportional reasoning skills using real-world problems.

Audience: Grades 5-9, and the gaming community



- Any where, any time
- Live play with scoring
- Aural and visual feedback
- Focused education content
- iPhone, iPad, Droid phone
- Release: November 2011
- Partnership outreach emphasis



Web Statistics - Classroom

- Unique Sessions (average): 1,800 teachers/month
- Downloads (average): 4,000/documents/month
- If these teachers use the product with 2 classes of 30 students each, then: **1,080,000 students/year**

Teacher Professional Development Workshops

- FY11: 23 workshops by Smart Skies office; 497 teachers

Informal Education Outreach

- FY11: 3 venues by Smart Skies office; 760 students



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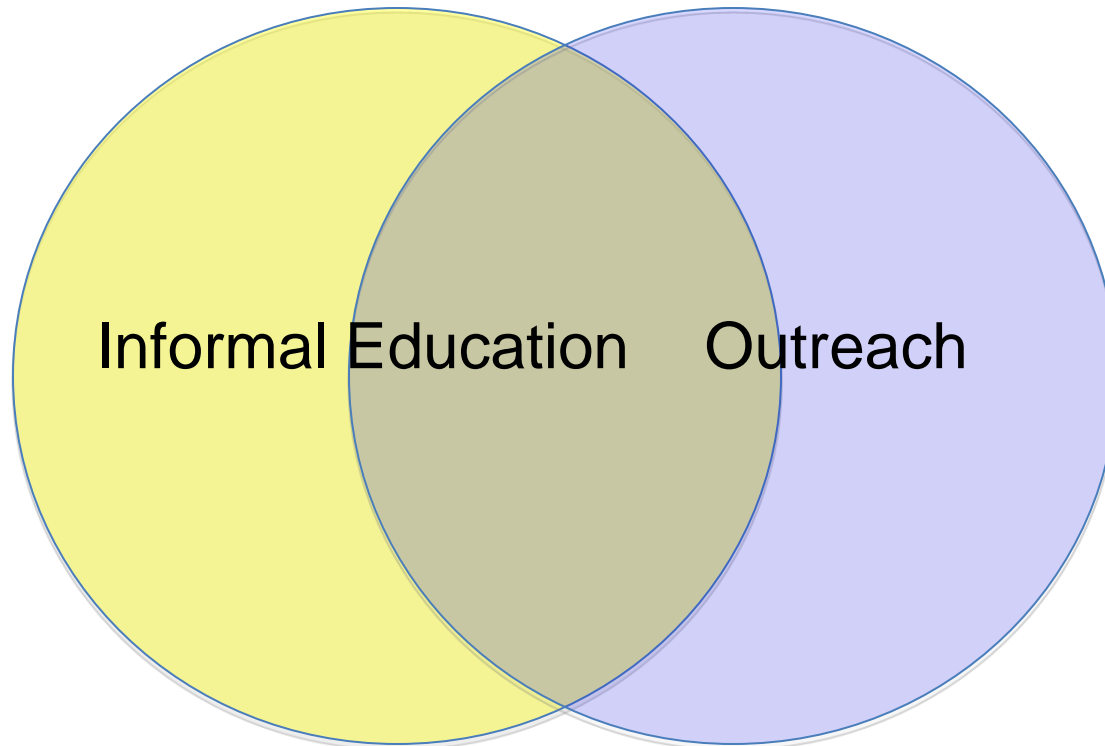
Informal Education & Public Outreach

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Informal Education & Public Outreach

Ames Informal Education and Outreach programs managed synergistically.





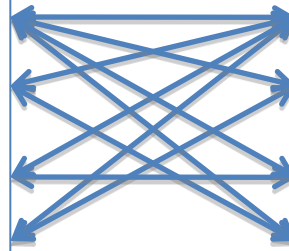
Informal Education & Public Outreach

FY'11 146,504 people engaged/inspired (FY'10 = 152,748)



Informal Education

- Special Events
- “Field Trips”
- Exhibits
- Community Lectures



Outreach

- Exploration Center
- Speakers Bureau
- Exhibit Loans
- Community Events



Informal Education & Public Outreach Yuri's Education Day – April 8, 2011

- 7,000 students + their teachers and chaperones attended.
 - 79 schools (45% elementary, 36% middle, 17% high school)
 - 3,395 students from Title I schools, 212 home school
- 64 exhibits/activities provided by NASA and community partners
 - Speaker stage featuring NASA talks and demonstration
 - Curriculum based guide for teachers



“Vargas students had a great time and were so excited that one of our students was able to display her experimentshe now wants to be a research doctor.”



Informal Education & Public Outreach

Exploration Center Field Trips

Free field trips for 4th and 5th grade classes

Covers a large number of CA Earth Science standards for each grade

Beta-tested Spring 2011 for Fall implementation

Plans to expand to additional grades and subject areas

National Aeronautics and Space Administration

NASA Ames Exploration Center
FREE Field Trip Experience - 5th Grade

NASA Ames Exploration Center is now offering **FREE half-day field trip experiences!** Join us for an opportunity to not only experience NASA technology and missions first hand, but partake in exciting hands-on learning activities in Earth Science.

Covered Science Content Standards for California Public Schools,
Fourth Grade: 4.e, 5.a, 5.p, 5.c

To book a trip, visit:
[www.nasa.gov/centers/ames/home/exploration/fieldtrips]

The Trip Includes:

- Theater Presentation: *Earth's Wild Ride*
- Hands-On Activity: *Color the Rock Cycle*
- Hands-On Activity: *Awesome Abrasion*
- On-The-Floor Presentation: *The Apollo Moon Room*
- Back at the Classroom: *Reaping Rocks*

Trips typically last between 2 and 2.5 hours (not including the "Back at the Classroom" activity) and are available at 10 a.m. and 1 p.m. Spaces are limited. For more information or to book a trip visit
[www.nasa.gov/centers/ames/home/exploration/fieldtrips.html]

www.nasa.gov

encounter

Informal Education & Public Outreach



"...I had a great time seeing the launch, and the guest speakers were excellent. Airfare issues prevented me from seeing it at Cape Canaveral, but I can safely say that this was the next best thing..." Cliff Redeker

Rocket Make-Fly-Take Event



Partnered with the Livermore Unit of the National Association of Rocketry (LUNAR)

43 junior rocketeers made & launched their own rockets



Informal Education & Public Outreach Exploration Center - Summer Science Series

- Summer family experience, 2nd Saturday each month
- Speakers, hands-on activities, & citizen science
 - June: Kepler (**50 attendees**)
 - July: Space Biology (**150 attendees**)
 - August: SOFIA



- Fall program to involve middle school educators



Informal Education & Public Outreach Education Integration Meetings

Structure: Office of Education convenes E/PO Leads monthly
Regularly scheduled meetings to share ideas openly

Goals:

- To share & inform one another of E/PO efforts & partnerships
- To potentially capitalize on shared resources
- To look for areas of possible collaboration
- To work strategically to leverage limited resources
- To more effectively assist Mission E/PO leads to better utilize Agency wide Education partnerships & networks



Informal Education & Public Outreach

TEDxNASA

August 17, 2011 - First TEDxNASA event on the West Coast
Will bring together thought leaders from a variety of disciplines for the exchange of game-changing ideas under the theme “Extreme Green.”

Independently organized event is in the spirit of the TED (Technology, Entertainment & Design) conferences that bring together leading thinkers to create a dialogue about important global challenges





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Social Media & NASA Apps

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Mr. Jerry Colen
Project Manager, NASA Apps
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650.604.1896



Social Media at NASA Ames





Social Media at NASA Ames



facebook

Nasa Ames – 11,000
Kepler – 7,306
Sofia – 2,775
NLSI – 1,837

*Plus 4 other Ames
accounts



twitter

@NasaAmes – 23,999
@Kepler – 148,893
@Sofia – 5,214
@NLSI – 15,087
@LADEE – 12,400

*Plus 11 other Ames
accounts



NASA App



Ames – The innovator and leader
In mobile app development.



NASA App

Reasons:

- Provides a richer experience than mobile web
- Makes NASA's amazing content available anytime and anywhere
- Gives access to a whole new group of users
- Increases awareness and participation



NASA App

Firsts:

- Released first mobile app for the agency on Oct. 23, 2009 (NASA App - iPhone)
- Released first iPad app for the agency on Sept. 2, 2010 (NASA App HD - iPad)
- Released Android app on July 7, 2011



NASA App

Some of the features:

- Current missions with a short description/summary of each
- Easy access to over 150,000 images
- On demand NASA Videos from around the agency
- Live Streaming of NASA TV
- News and Features from the NASA topic areas
- Twitter Feeds from around the agency



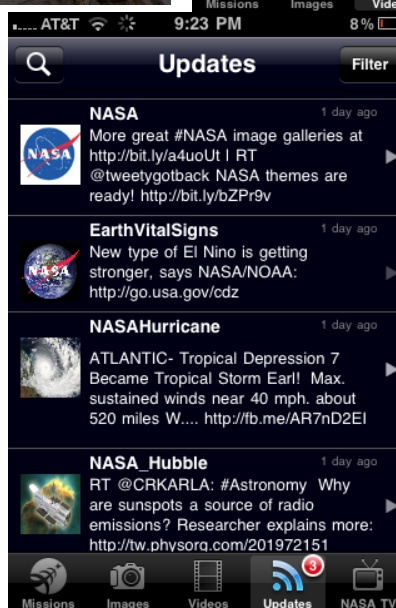
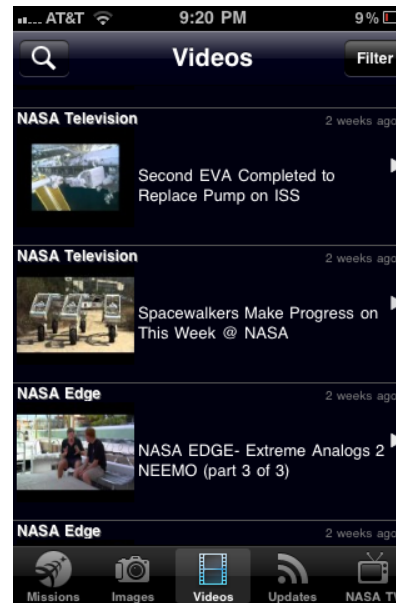
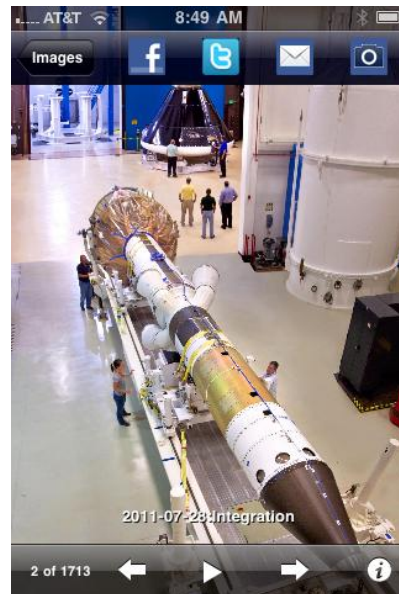
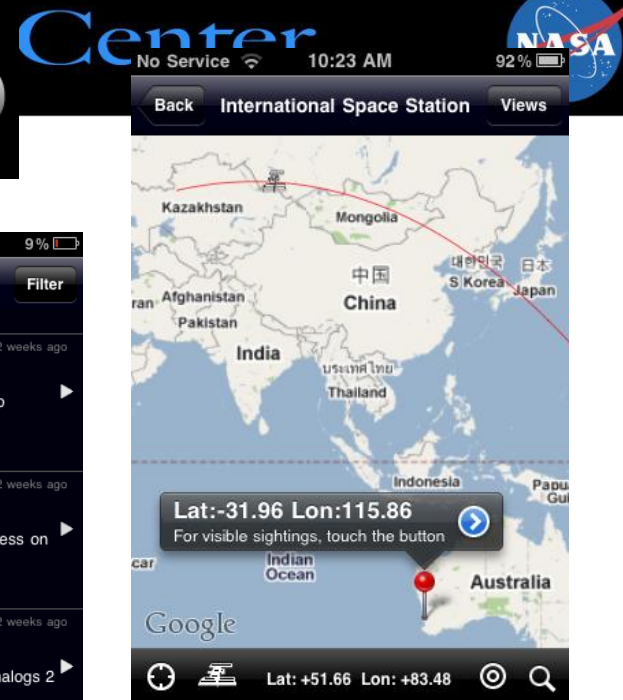
NASA App

More features:

- Current Visible Passes for the International Space Station (ISS)
- ISS and Earth Orbiting Satellite Trackers
- Featured content section
- Launch Information & Countdown clocks
- Map and links to all of the NASA centers

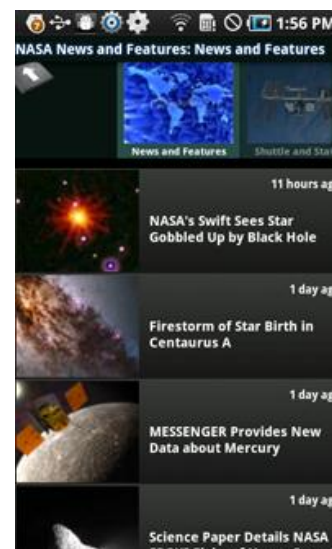
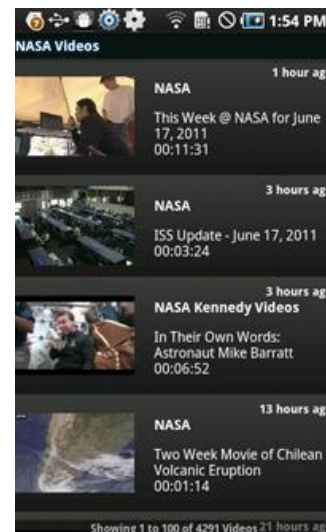


NASA App iPhone





NASA App Android





NASA App- iPad





NASA App - Success

- Over 5.96 million downloads
- Web Traffic - Over 19 million visits, 487 million hits and over 19.4 TB of data (last 12 months)
- Averaging 4.4 out of 5 stars from user reviews
- Outstanding reviews from CNN, Wired, CNET, MacWorld, The Register, Telegraph...



Agenda (8:30-11:00 am)

- Welcome & Introduction – Mr. Gary Martin
- Overview of Ames Education & Public Outreach – Mr. Donald James
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- K-12 – Mr. Tom Clausen
- Smart SkiesTM – Mr. Greg Condon
- Informal Education & Outreach – Ms. Laura Lewis
- Social Media & NASA Apps – Mr. John Yembrick & Mr. Jerry Colen
- 10:20 Spaceward Bound & NASA Academy – Dr. Liza Coe
- Robotics Academy & LMR – Mr. Mark Leon & Ms. Jenny Yang



Spaceward Bound

A program model for teacher professional development in NASA-unique planetary analog science and exploration technology

*We who are explorers must diligently work to
inspire and train those who will become our
future*

Dr. Chris McKay, Science PI

Dr. Liza Coe, Education PI

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Spaceward Bound Overview

- During Spaceward Bound expeditions, teachers develop into field assistants and become contributing members of research expeditions to extreme environments, investigating the science and technology of planetary exploration.
- The goal of Spaceward Bound is to motivate and train teachers to leverage the content, concepts, processes and skills of field research in their classrooms, thereby legitimately conveying to their students the reality of modern research practice as well as the nature of exploration and discovery.
- Spaceward Bound is motivated by the inability of modern pedagogy to support development of mental models that engender and encourage curiosity and exploration. *Those who will do boots-on-the-ground exploration of planets, moons, and asteroids are in kindergarten today.*
- Spaceward Bound benefits *both* education and research. Bi-directional sharing of knowledge and development of new ideas engenders mutual respect, understanding, and appreciation for the professional skills of all expedition members.



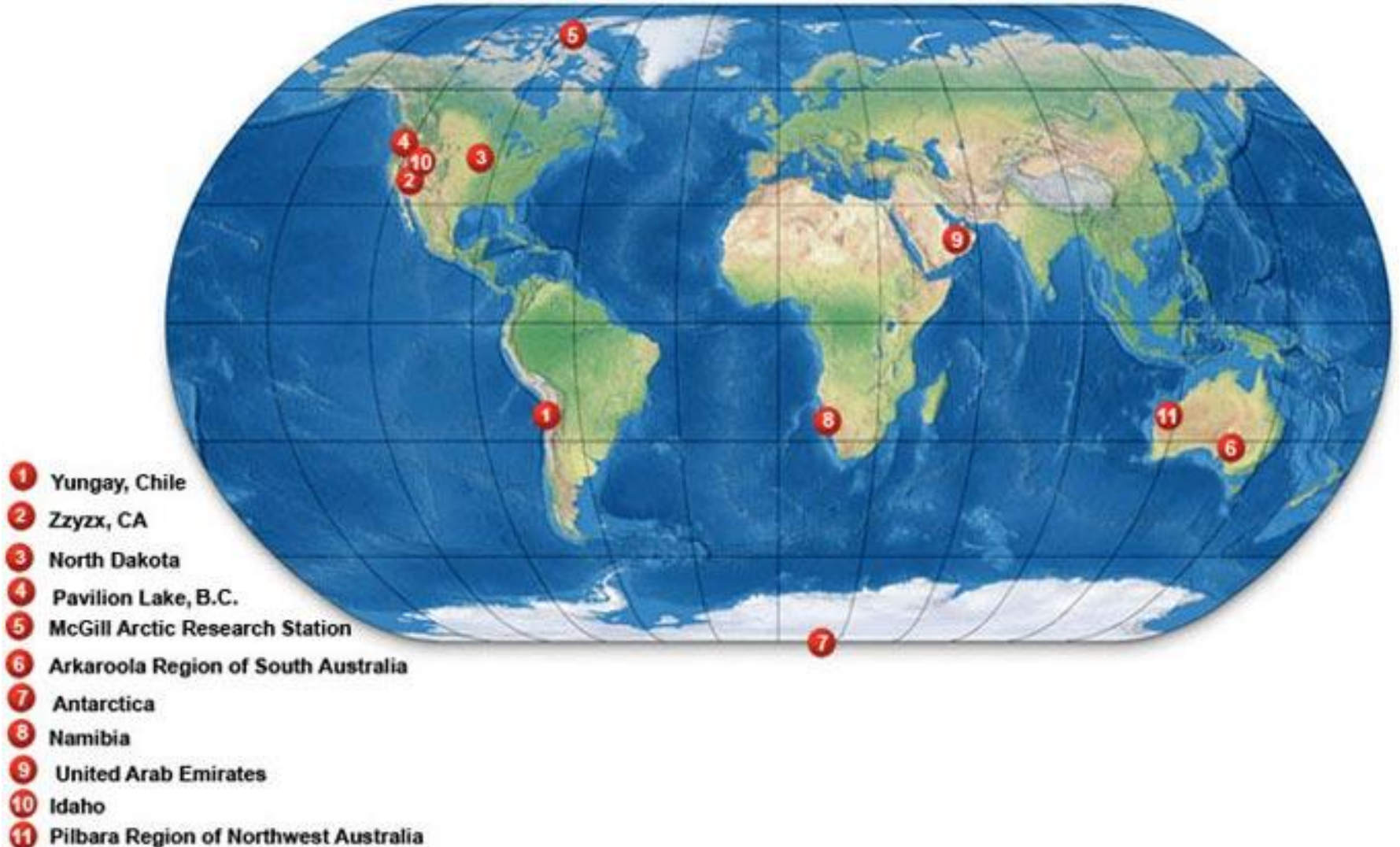
Spaceward Bound Program

- The Spaceward Bound model is integrated into research expeditions – *not the other way around*
- We select teachers whose first two thoughts upon introduction to Spaceward Bound are:
 - *“Awesome! I’ll learn and experience so much! I want to go!”*
 - *“How cool it will be when I bring this back to my students!”*
- We utilize the pedagogically rich concept of planetary analogs to create a framework for learning science and the conduct of scientific collaboration; technology and the conduct of exploration and discovery
- Multiple pre-expedition training sessions via internet initiate learning (*science, technology, the scientists and their research, expedition logistics*). Homework requires collaboration between teachers and consultation with scientists/engineers.
- We utilize social media for collaboration between alumni and to facilitate the sharing of ideas and practices. Alumni mentor first-expedition teachers and become eligible for participation in more complex and challenging expeditions.



20 Spaceward Bound expeditions to date

International expeditions partner U.S. teachers with in-country teachers and include outreach programs to local schools, universities and public venues.





Spaceward Bound Outcomes

- Over 150 teachers have participated in Spaceward Bound expeditions
- Application of the Spaceward Bound program model is the topic of two doctoral dissertations in process – one in the U.S. and one in Australia
- Alumni have:
 - established cross-country and international collaborations between their students (e.g. to build and fly instrumented balloons);
 - published in peer-reviewed education and research journals, and presented at education, space science, and planetary science conferences in the U.S. and abroad;
 - continued their association with NASA - many have taken internships in education and research;
 - maintained their relationships with scientists/engineers as mentors for their own learning and as resources for their students;
 - participated in other NASA (e.g. NES, NEAT) and non-NASA programs (e.g. PolarTrec);
 - created and established Spaceward Bound-based curriculum and courses at their school (e.g. Fresno County Office of Education Court and Community Schools);
 - teamed with teachers and scientists to take their students on Spaceward Bound-like expeditions;
 - incorporated exploration and planetary analog themes into their curriculum;
 - developed hands-on, authentic science activities in which students participate in scientific discovery within their context and the larger scientific community.



NASA Academy for Space Exploration

Dr. Liza Coe

NASA Academy Task Manager

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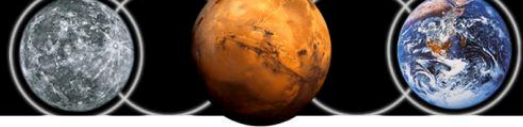
Brad Bailey

NASA Academy Director

Brad.Bailey@nasa.gov

(650) 604-2104





Academy Overview

(Modeled after International Space University)

Academy goal is to help guide future leaders of the US Space Program by providing insight into the integration of NASA and its various center specialties, including research institutes, commercial space, academia and business.

10-week immersive and intensive summer program that focuses on leadership, teamwork, and research in advanced sciences, technology and engineering.

For rising undergraduate junior, senior, and first year graduate students

International Partners: CSA, JAXA, VSSEC, ESA, CNES





Academy Program



- **70% time:** Individual research with Principal Investigator
 - Academy PIs represent six ARC directorates across the center
 - (A, I, P, S, T, V)
- **30% time** is spent the following way:
 - Team Building, Networking, Fiscal Acumen Training, Personal and Professional Development Activities
 - Guests speakers (~20 over the course of the summer)
 - Leadership – managers (e.g. Lori Garver, Pete Worden, Bill Parsons, Rick Heib, Bob Richards, Carl Pilcher)
 - Science – (e.g. Jill Tartar, Frank Drake, Chris McKay, David Morrison)
 - Group Project – Past group projects have flown on the Shuttle, flown on ZERO-G, been deployed in hydrothermal vents via submersible, continued at MDRS and 3 have been continued as MS/PhD thesis topics.
 - Exposure to the rest of the Space Community (Commercial, Research Institutes, Academic Institutions, other NASA Centers)
- **Evenings and weekends are spent on the group project, lectures, and team-building activities.**



Academy Record of Success

Academy Achievements

- As of 2010, out of 156 Ames Alumni, there are
 - Masters Degrees 102
 - Doctorates 85
 - Medical Doctors 18
 - Juris Doctorates 2
- 3 Rhodes Scholars, 2 Marshall Scholars,
1 Churchill Scholar 1 Goldwater Scholar,
5 ISU participants
- Employment (CS and Contractor)
 - ARC = 19 • GSFC = 5
 - JSC = 5 • DFRC = 1
 - KSC = 3 • MSFC = 1
 - JPL = 4 • HQ = 2
 - GRC = 2
- Other Government Institutions (USGS, OMB, OSTP, DoD) = 8
- Faculty Appointments = 9



NASA Academy Alumni Association – Upon completion of the Academy program, students are inducted into the NAAA, a group of more than 700 Academy Alumni that organizes and distributes opportunities for young researchers and students

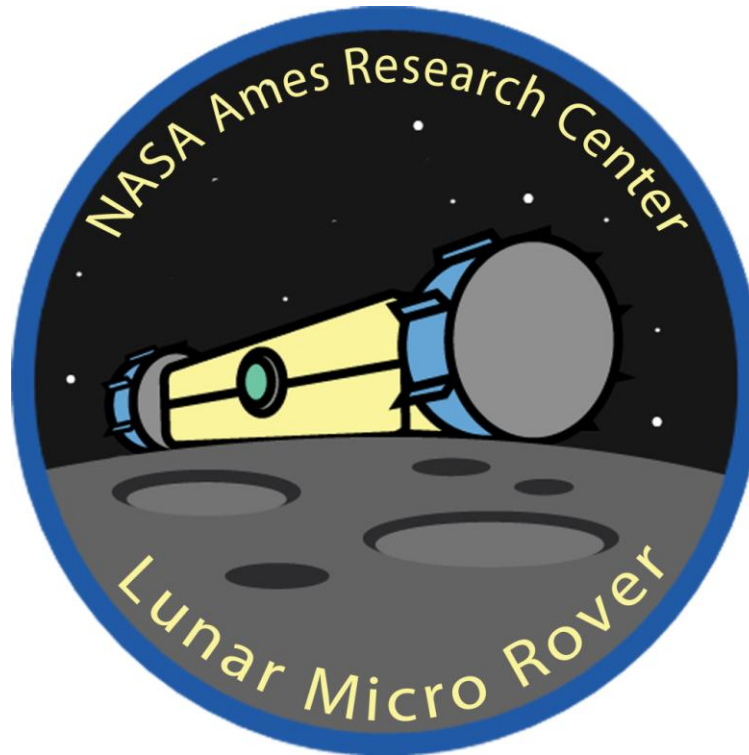


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NASA Ames Robotics Academy



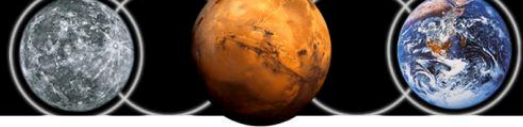
Mr. Mark J. Leon, Project Manager

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Ms. Jenny Yang, Education Associates Intern

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About LMR Project

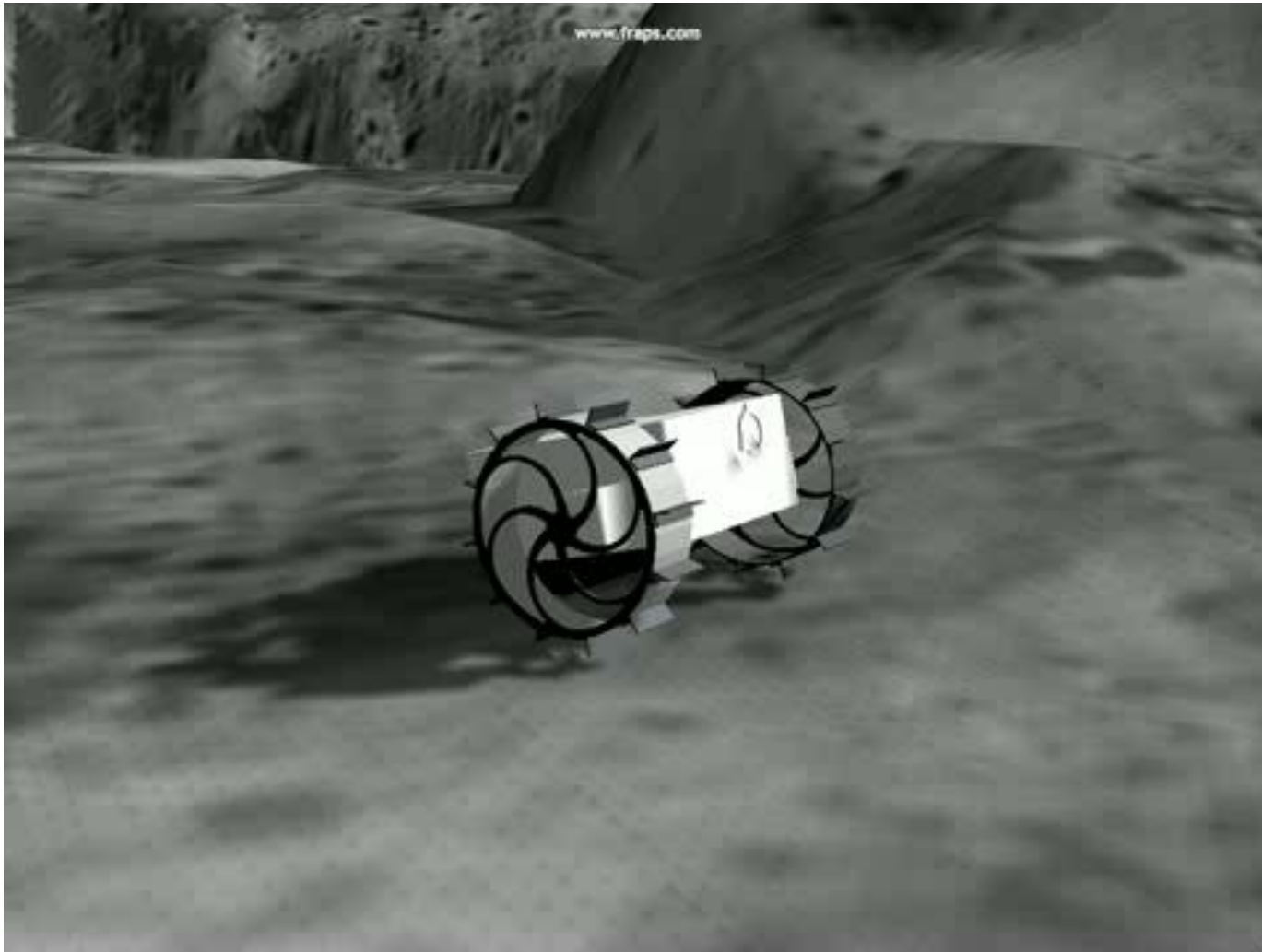
- **Vision:** Leverage innovative collaboration between Industry, Academia, and Government agencies to produce inexpensive regenerative Lunar Micro Rovers* capable of enduring the Lunar thermodynamic cycle.
- **Mission:** To construct Lunar Micro Rovers from a family of interoperable modular subsystems capable of supporting a variety of technical objectives such as supporting Micro-Payloads, Lunar Exploration, Extended Deployment, and Tele-Operation.
- **Funding:** The project is funded through SMD and National Space Grant Consortium.

* Micro Rover is defined by JPL as a rover with a mass less than 10 Kg.





Simulation Screenshot

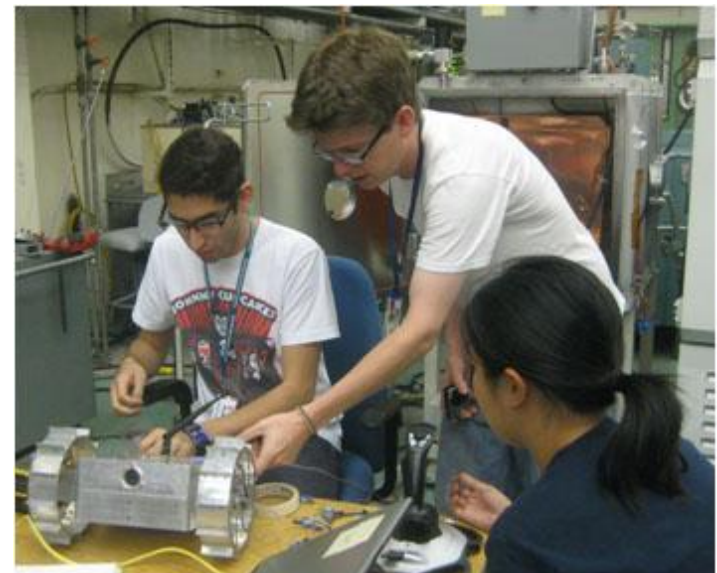
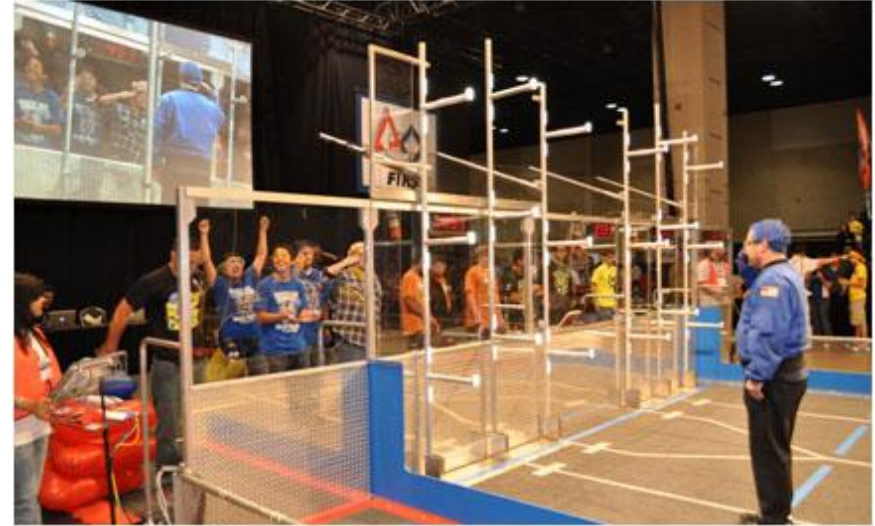




RAP Educational Outreach

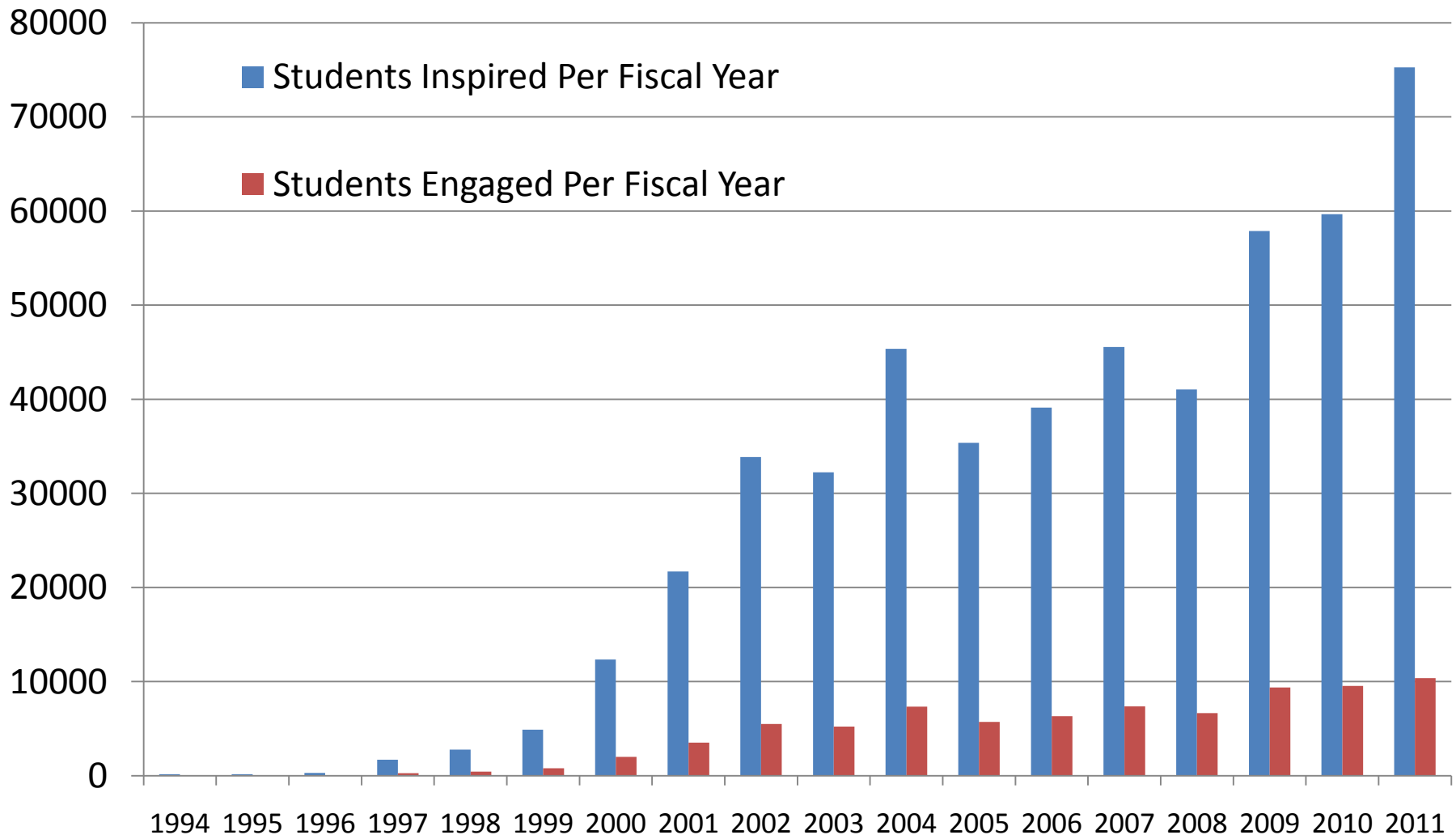
National Impact

- 10377 Students Engaged in FY11
- 75260 Students Inspired in FY11
- 80637 Students Engaged To Date
- 509460 Students Inspired To Date





RAP Educational Outreach







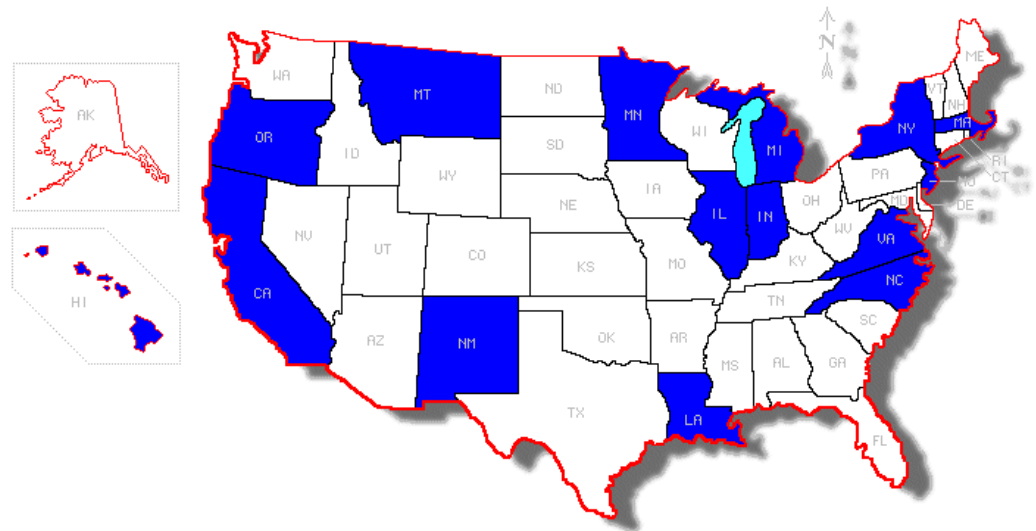
NASA Ames Lunar Robotics Academy Class of 2011

25 Colleges with Students Participating:

- Rose-Hulman Institute of Technology (Terre Haute, In)
- University of New Mexico (Albuquerque, NM)
- University of Rochester (Rochester, NY)
- Polytechnic University (New York, NY)
- Cal Poly Pomona (Pomona, CA)
- Princeton (Princeton, NJ)
- Worcester Polytechnic Institute (Worcester, MA)
- University of Oregon (Eugene, OR)
- University of Hawaii at Manoa (Honolulu, HI)
- North Carolina State University (Raleigh, NC)
- University of Michigan (Ann Arbor, MI)
- University of Illinois (Urbana-Champaign, IL)
- Louisiana State University (Baton Rouge, LA)
- University of Mary Washington (Fredericksburg, VA)
- Purdue University (West Lafayette, IN)
- San Jose State University (San Jose, CA)
- California State University East Bay (Hayward, CA)
- Oregon State University (Corvallis, OR)
- University of California San Diego (La Jolla, CA)
- Santa Clara University (Santa Clara, CA)
- Montana State University (Bozeman, MT)
- University of Minnesota (Minneapolis, MN)
- Cal Poly San Luis Obispo (San Luis Obispo, CA)
- Massachusetts Institute of Technology (Cambridge, MA)
- University of Southern California (Los Angeles, CA)

4 High Schools with Students Participating:

- Prospect High School (San Jose, CA)
- Gunn High School (Palo Alto, CA)
- Lynbrook High School (San Jose, CA)
- Palo Alto High School (Palo Alto, CA)



15 States Represented:

- | | |
|-----------------|------------------|
| – Indiana | – Hawaii |
| – New Mexico | – North Carolina |
| – New York | – Michigan |
| – California | – Illinois |
| – New Jersey | – Louisiana |
| – Massachusetts | – Virginia |
| – Oregon | – Minnesota |
| | – Montana |



NASA Ames Lunar Robotics Academy Class of 2011

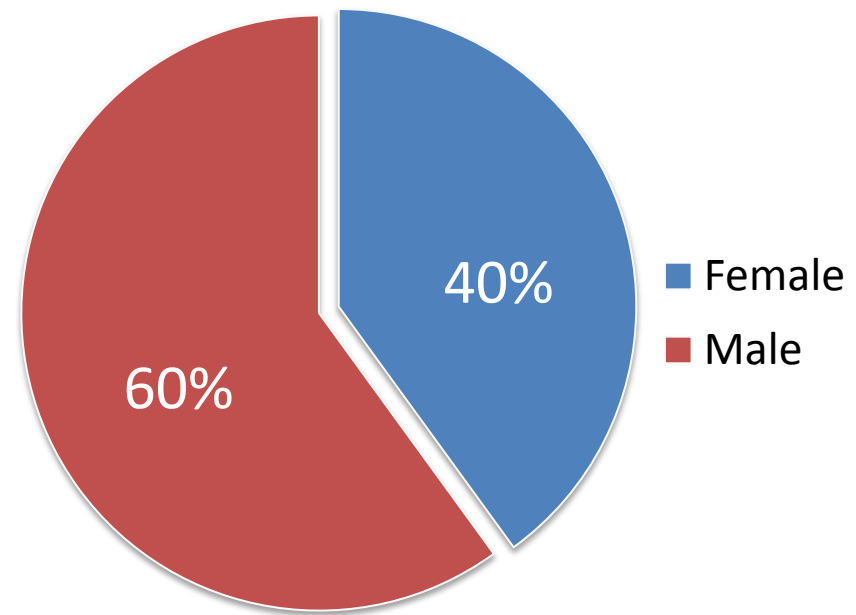
- 33 students composed of 4 Masters Students, 25 Bachelors Students and 4 High School Students
- Over 100 students inspired to pursue careers in science and technology through Robotics Academy
- 11 returning students to further rover development and self growth
- 73% of students have participated in an RAP sponsored program (*FIRST*, Botball, BEST, VEX)





NASA Ames Lunar Robotics Academy Class of 2011

Major	Percentage
Mechanical Engineering	30%
Computer Science	18%
Applied Mathematics	12%
Applied Physics	12%
Electrical Engineering	12%
Business	6%
Aerospace Engineering	3%
Computer Engineering	3%
Robotics Engineering	3%





Session 1 - Closing Comments

Questions?